

REMARKS

Claims 1-12 are currently pending. Claims 1-12 have been amended.

Reconsideration of the above-identified application, in light of the above amendments and the following remarks, is respectfully requested.

Claim 1 has been amended to recite the method steps in gerund form to conform to U.S. practice. Claims 2-5 and 7-12 have been amended to replace the phrase “characterized in that” with “wherein,” and Claim 6 has been amended to replace the phrase “characterized in that” with “comprising,” in accordance with U.S. practice.

Claim 1 has been additionally amended to recite “injecting” a “chemical” reducing agent “into” a slag layer. Support for these amendments is found throughout the Specification and Drawings, as filed, for example at page 4, lines 11-13; and in Figures 1-7.

Claim 2 has been amended to specify that the “entire melt” includes both matte and slag. Support for these amendments is found throughout the Specification and Drawings, as filed, for example at page 4, lines 24-25 and in Figures 1-7.

Claims 3, 4, and 6 have been amended to recite a “chemical” reducing agent to better define Applicants’ invention, and Claim 5 has been amended to recite “chemically reduced slag” for the same reason. Support for these amendments is found throughout the Specification and Drawings, as filed, for example at page 4, lines 11-14.

Claim 5 has been further amended to correct a typographical error in the word “channeled.”

Claim 6 has been amended to recite “introducing a chemical reducing agent” to better define Applicants’ invention. Support for these amendments is found throughout the Specification and Drawings, as filed. Claim 6 has been further amended to recite that the

equipment comprises a “smelting furnace having a reaction shaft, an uptake and a lower furnace which acts as a settler and is arranged below the reaction shaft and uptake” to better define Applicants’ invention. Support for this amendment is found throughout the Specification and Drawings, as filed, for example at page 4, lines 11-29 and in Figures 1-7. Finally, Claim 6 has been amended to recite that the throttle point has “a reduced width and reduced cross-sectional area.” Support for this amendment is found throughout the Specification and Drawings, as filed, for example at page 4, lines 11-24; and in Figures 1-7.

Claim 8 has been amended to recite that the throttle point is formed “in” an area of the lower furnace after “on a side of the uptake which is opposite the reaction shaft.” to better define Applicants’ invention. Support for this amendment is found throughout the Specification and Drawings, as filed, for example at page 6 and in Figures 3-7.

Claims 1-12 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. See Office Action at page 4. More specifically, the Office Action argues, “‘throttle point (5)’ is indefinite because its structure and its function is not clearly claimed; also, how does it differ from ‘the reduction point’ of Claims 4.” Regarding the throttle point, Applicants submit that, as amended, Claim 1 adequately defines the structure and function in light of the specification. Specifically, Claim 1, as amended, recites “in which throttle point the width and cross-sectional area of said furnace are decreased....” Regarding the claimed “reduction” agent and point, Applicants have amended the appropriate claims to recite a “chemical” reduction, in contrast with a dimensional reduction.

The Office Action further argues, “Claim 1 is indefinite because the expression ‘the slag is reduced’ in Claim 1 is indefinite since the expression ‘reduced’ is not defined for

example is it a chemical reaction?” As set forth above, Claim 1 has been amended to specify a “chemical” reducing agent.

The Office Action continues, “Claim 2 is indefinite because the expression ‘entire melt’ is not defined. Claim 3 is indefinite because there is no antecedent basis for ‘the reduction point.’ Claim 4 is indefinite because the expression ‘reduction point’ is indefinite where is it shown and how does it differ from ‘throttle point (5)’ is unclear.” Regarding Claim 2, Applicants have amended Claim 2 to recite that the “entire melt” includes both the matte and slag. Regarding Claim 3, this claim has been amended to recite “a chemical reduction point,” thus eliminating the lack of antecedent basis. Regarding Claim 4, the term “chemical reduction point” is used to emphasize the method (the chemical reduction of the slag) over the apparatus (a physical reduction in cross-sectional area, which creates a throttle point. Applicants respectfully submit that in light of the Specification and Claims, as amended, the distinction between “throttle point” and “reduction point” is sufficiently evident.

Regarding Claims 6, and 7, the Office Action argues, “Claim 6 is indefinite because the expression ‘lower furnace’ is indefinite because its structural relationship to ‘Equipment’ is not set forth. “ Claim 7 is indefinite because ‘is formed to an area of the lower furnace’ is indefinite and there is no antecedent basis for ‘the reaction shaft and the uptake.’” As set forth above, Claim 6 has been amended, and now further defines the lower furnace in terms of the reaction shaft, uptake and its partial function as a settler. Claim 7 has been amended to recite “formed in an area....” to better define Applicants’ invention, while amended Claim 6 provides the antecedent basis necessary for the recitation in Claim 7 of “the reaction shaft and the uptake.”

Regarding Claims 8 and 10, the Office Action argues, “Claim 8 is indefinite because there is no antecedent basis for ‘an area of the lower furnace after the uptake’ and the expression ‘is formed to an area’ is indefinite. “[In Claim] 10 there is no antecedent basis for ‘the slag-tapping hole.’” Regarding Claim 8, as set forth above, Claim 8 has been amended to recite that the throttle point is formed “in” an area of the lower furnace after “on a side of the uptake which is opposite the reaction shaft.” As such, Applicants respectfully submit that Claim 8, as amended, satisfies the requirements of 35 U.S.C. §112 for definiteness. Claim 10 has been amended to recite “a slag-tapping hole,” thereby eliminating the lack of antecedent basis for this recitation.

Claims 1-3, 5-7, and 9-12 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,283,045 to Melcher (“Melcher”). See Office Action at page 2.

Independent method Claim 1, as amended, recites a method for smelting non-ferrous metal sulphides in a suspension smelting furnace, to produce matte with a high non-ferrous metal content and disposable slag, the method comprising: injecting a carbonaceous chemical reducing agent for chemically reducing slag into a throttle point formed in a lower furnace, in which throttle point the width and cross-sectional area of said furnace are decreased, the chemical reducing agent being injected, via tuyeres, into a slag layer.

Independent apparatus Claim 6, as amended, recites equipment for smelting non-ferrous metal sulphides in a suspension smelting furnace, producing matte with a high non-ferrous metal content and slag which is reduced for disposal, the equipment comprising a smelting furnace having a reaction shaft, an uptake and a lower furnace which acts as a settler and is arranged below the reaction shaft and uptake, the lower furnace being furnished with a

throttle point having a reduced width and reduced cross-sectional area and tuyeres placed therein for introducing a chemical reducing agent.

In contrast, Melcher describes an apparatus to recover tin from an iron rich tin concentrate. The concentrate is smelted to produce a smelt containing tin and iron silicates. The smelt is reduced with a gaseous reducing agent, which is blown by means of a plurality of jets onto the smelt. The smelting of the concentrate takes place in the area of the material inlet while the overflow weir for the slag is on the opposite side of the furnace. The depth of the furnace is deepest on the inlet side, the end at which the overflow of molten metal occurs. That is, the slag and metal overflow occur at opposite ends of the furnace.

Melcher uses a gaseous reducing agent blown onto the surface of the melt, while Applicants' claimed invention utilizes injection of a carbonaceous reducing agent into the slag phase. In order to obtain improved contact between the slag and reducing agent, the tuyeres are located in a throttle area of reduced width.

In Melcher, a sloping floor (22) of the reactor (1) provides a region for raw tin to settle (21). Melcher does not teach or suggest a defined throttle point, as claimed. The width of the reactor in Melcher is not altered at any point, as claimed by Applicants. The reduced depth of the settling region in Melcher only effects the location in which the raw tin settles. The dimensions of the slag layer (23) in Melcher are not effected by the sloping floor (22), as is seen In Figure 5. For example, the depth of the slag layer exposed to jets (11) does not change throughout the length of the reactor, thereby providing no improvement in direct contact between the gasses coming therefrom and the slag. In contrast, in Applicants' claimed invention, the claimed reduction in width of the throttle point allows for increased efficacy of the reduction step occurring therein.

Moreover, in the claimed invention, as recited in Claim 2, both slag and matte are discharged at the same end of the furnace.

Melcher does not teach or suggest an apparatus or method in which, a throttle point includes a reduced width, as claimed in independent Claims 1 and 6 or that a chemical reducing agent is injected, via tuyeres, into a slag layer, also as claimed in independent Claims 1 and 6. Moreover, Melcher does not teach or suggest that the entire melt, including matter and slag, flows through the throttle point, as claimed in Claim 2.

For at least the foregoing reasons, independent Claims 1 and 6 define patentable subject matter over Melcher. Withdrawal of the rejection applied to former claims 1-12 under 35 U.S.C. § 103(a) as being unpatentable over Melcher is respectfully requested.

CONCLUSION

Based on the foregoing amendments and remarks, Applicants respectfully request reconsideration and withdrawal of the rejection of claims and allowance of this application.

Respectfully submitted,



Israel Blum
Registration No. 26,710

Dated: April 28, 2004

Correspondence Address:

MORGAN & FINNEGAN, L.L.P.
345 Park Avenue
New York, NY 10154-0053
(212) 758-4800 Telephone
(212) 751-6849 Facsimile

